erable to arrange the terms in alphabetical order.——Nearly one hundred geographic names from the State of Minnesota have been traced to their origin in the Dakota language in the thirteenth annual report of the State geologist of Minnesota, Professor N. H. Winchell (1884, pp. 104–112, 8vo). The author of the treatise, Professor A. W. Williamson, gives evidence of assiduous work in tracing the etymologies of all these village, lake and river names. The usual spelling of local names of Indian origin generally differs from their pronunciation by the Indians, which is the correct one; this Indian mode of spelling has therefore been added to each name, whenever there was necessity for it. His remark, that "most Dakotas very slightly nasalize all their vowels," must be, we think modified by adding the statement, that they do not nasalize the vowels in *every* word of the language, but in a large number of them.——Recent numbers of the Bulletin of the Torrey Botanical Club, New York, contains linguistic inquiries into the origin of plant names. Thus we find disclosures upon so-called Southern moss, Tillandsia, upon ginkgo (*Salisburia adiantiflora*), Cintractia, Savoyanne, a species of Coptis; this name is traced by W. R. Gerard, of New York, to a term appearing in several of the northern Algónkin dialects. All the above will be found in the July number of 1885. In the August number Mr. Gerard has an interesting article upon the *Indian peach*, which he states was introduced into North America both by way of Mexico and the Atlantic seaboard. The Indian equivalents are given at the close of the article.—*Albert S. Gatschet.*

MICROSCOPY.[1]

THE EYE OF INSECTS.—The following is a summary of some of the methods employed by S. J. Hickson[2] in the study of the eye of *Musca vomitoria*:

1. For making sections of the eye, it is best to dissect away the posterior wall of the cranium, and then expose it to the fumes of an osmic acid (1 p. c.) solution, 40 minutes, then to wash in 60 p. c. alcohol for a few minutes, and finally, to harden in absolute alcohol.

2. The ribbon method of sectioning can be employed with this species; but with most insects, owing to the hard chitinous cranium, it is necessary to cut, with the knife set obliquely, so as to get a long sweep at each stroke, and to remove the sections one by one.

3. The best method of depigmenting, is that of exposing the sections to nitrous fumes. The sections are fixed on the slide with P. Mayer's albumen fixative, the paraffine removed with turpentine, the turpentine driven off by absolute alcohol, and then

[1] Edited by Dr. C. O. WHITMAN, Mus. Comparative Zoology, Cambridge, Mass.
[2] Quart. Journ. Mic. Sc., XXV, April, 1885, p. 243.

the slide inverted over a capsule containing 90 p. c. alcohol to which a few drops of strong nitric acid have been added. Copious fumes are given off, and the pigment dissolves. The action can be arrested at any moment by washing with neutral alcohol.

4. The sections are next stained with hæmatoxylin or with any other solution. The best results were obtained with hæmatoxylin made after Mitchell's[1] formula.

For teasing the best solution is chloral hydrate. The preparation is left in a 5 p. c. solution for twenty-four hours, and then teased with needles and mounted in glycerine.

Grenacher's Methods of Preparing the Arthropod Eye.[2] —*Hardening Fluids.*—Chromic acid and its salts produce a coarse granulation, and on this account must be considered objectionable. Oxalic acid, in aqueous or alcoholic solution, as recommended by M. Schultze and Steinlin, gives good results in some cases, bad in others. Picric acid gives wholly unsatisfactory preparations, while picro-sulphuric acid works well in many cases. The latter fluid, cannot, however, be used with most of the Crustacea, as here the integument contains calcareous salts which react with the acid to produce crystals of gypsum and carbonic acid, both of which work injury to the soft tissues. Merkel's chrom-platinum solution gives excellent results with some simple eyes (*e. g.* Phalangium and Acilius larvæ), but is unsatisfactory in the case of spiders and with compound eyes. Osmic acid, so highly recommended by M. Schultze, while it has some valuable qualities, is, on the whole, not very serviceable. It preserves, to a certain extent, the character of the fresh tissues, but it *renders the pigment less easily soluble*, lessens important differences in refrangibility (*e. g.* between the rhabdomeres and the protoplasm of the cells), and besides leaves the preparation brittle, so that good sections are not easily obtained.

The most serviceable hardening fluid for the compound eye is alcohol (70 p. c.–90 p. c.). The hyaline rhabdomeres generally remain clear and transparent, but lose their color and often a part of their refrangibility.

Bleaching.—The pigment is dissolved very rapidly by caustic potash, but this agent destroys almost equally rapidly other parts, even to the chitinous parts. The strength first recommended by Moleschott, 30–35 p. c., allows time for examination in detail. The best means of bleaching is found in nitric acid, first recommended for this purpose by Gottsche[3]. Gottsche used the full strength, M. Schultze, 25 p. c.; Grenacher employed 20–25 p. c., adding a drop to the sections lying in dilute glycerine, under the cover-glass. The demonstration of nuclei by means of the ordi-

[1] The Science Monthly, March, 1884.
[2] "Das Sehorgan der Arthropoden," p. 22–25, 1879.
[3] Mül. Arch. 1852, p. 486.

nary dyes, after the use of nitric acid, is very difficult. This can be accomplished, however, in the following simple way: Add only a trace of nitric acid to the prepared section, and leave it 12–24 hours. The pigment dissolves slowly, and is taken up by the nuclei, and thus acts as a stain. The preparations are not beautiful, but are quite clear and distinct, and can be mounted without danger of disturbing the pigment. A similar proceeding (pigment dissolved by acetic acid) has been described by Leydig.[1]

The following is another mixture employed by Grenacher, as given by Carrière:[2]

Glycerine	1 part.
Alcohol (80 p. c.)	2 "
Hydrochloric acid	2–3 p. c.

The preparations remain in this mixture until the pigment changes color and becomes diffuse.

Method of Examining the Reflex in the Compound Eye of Insects.—Lowne[3] recommends the substitution of a reflecting ophthalmoscope for the eye-piece of a microscope. "By this means a bright luminous spot may be observed as a real image in the tube of the instrument. A quarter objective must be used, and the mirror of the ophthalmoscope must be strongly illuminated. The microscope is then focused so that a real image of the corneal facets is seen between the objective and the eye of the observer. By bringing the object-glass gradually nearer to the insect's eye the reflex will come into view. The reflex appears as a disk having a fiery glow, in moths, and as a bright ruby spot in the cabbage butterfly. Sometimes six spots, surrounding a central spot, are seen in the eye of the insect; perhaps these are diffraction-images. A similar appearance is seen when the eye of this insect is observed by the naked eye, except that the spots are black. * * * The reflex seen with the micro-opthalmoscope is green in Tipula, and bright yellow in the diurnal flies. Colored diffraction-fringes are usually present around the central bright spot in both these insects; but the central image is sometimes surrounded by a perfectly black ring."

"The manner in which the luminous reflex scintilates is very suggestive of an alteration in the focal plane of the dioptric structures under the control of the insect."

The color of the reflex obtained is supposed to depend on the color of the fluid contents of the "spindle" ("Rhabdom" of Grenacher), while the reflex itself is due to reflection from the spindles, which, in moths, are surrounded by very close parallel tracheal vessels, which form a very perfect reflector.

The reflex disappears very quickly even in diffused daylight,

[1] Auge der Gliederthiere, p. 41.

[2] Die Sehorgane der Thierë, p. 205, 1885.

[3] Trans. Linn. Soc. Lond. Second Ser., Zoology. Vol. II. Part 2, p. 406–7. Dec., 1884.

but can be restored by keeping the insect in the dark for half an hour. The disappearance of the reflex in the light is due to the contraction of the pigmented iris cells.

METHOD OF ISOLATING THE DIOPTRIC LAYERS OF THE COMPOUND EYE.—Gottsche[1] was the first who succeeded in isolating the whole dioptric portion of the compound eye, so that the corneal facets and the cones could be examined *in situ*. The isolation of the corneal layer alone is more easily effected; this had already been accomplished by Leeuwenhoek, Baker, Brants and Gruel, who examined with the microscope the images produced by the corneal facets.

Gottsche took the eye of a fly, and separated the inner wall, so that only the cornea with the optical apparatus remained. Holding the cornea fast by one end, he next removed the red portion of the eye, *i. e.*, the retinulæ. These break off at the inner ends of the cones, leaving the cornea with the cones intact. The preparation is next laid on a slide with the convex side of the cornea down (there should be just glycerine enough beneath the cornea to make it adhere to the slide). A cover-glass is then placed over the preparation, with care to leave the concave upper side filled with an air-bubble. Slight pressure on the cover-glass will usually be found sufficient to create the air-bubble. If no undue pressure has injured the cones, the preparation is now ready for examination with the microscope. The tube of the microscope may now be placed so that the hexagonal facets are in focus, and then raised until the inner (upper) ends of the cones become visible, but not sharply focused. If any object, *e.g.*, a steel pen, is now held between the mirror and the preparation, a minute inverted image of the same will be seen in each facet.

Grenacher thinks the contents of the cones ("pseudocones") would escape by Gottsche's method, so that the experiment would really amount to no more than that of Leeuwenhoek, Baker, &c.

Grenacher (Das Sehorgan d. Thiere, p. 148), taking the eye of acrepuscular or nocturnal moth that had been hardened in alcohol, cuts off a section with a sharp knife, places it on a slide with the convex corneal surface below, and then removes the pigment by a careful use of nitric acid. With this preparation he repeats the experiment of Gottsche, and finds that the images fall not behind nor in the ends, but near the middle of the crystal cones. This position of the images, at points where there are no percipient elements, is held by Grenacher to be fatal to the view that they are seen by the insect. According to Lowne's[2] view, the retinulæ constitute a second refractive system which serves to magnify and erect the images formed within the cones, so that the whole visual field consists of a mosaic of erect images.

[1] Mül. Arch., 1852, p. 488, 489.

[2] Trans. Linn. Soc. Lond., p. 389. Dec., 1884.

He places the retina behind the basilar membrane, precisely where it was supposed to be by Gottsche.

THE SAC-LIKE NATURE OF THE WINGS OF INSECTS.[1]—Mr. G. Dimmock showed the two halves of a split wing of *Attacus cecropia*, in which the two layers of the wing had been separated by the following mode: The wing from a specimen that has never been dried is put first into seventy per cent alcohol, then into absolute alcohol, and from the latter, after a few days' immersion, into turpentine. After remaining a day or two in turpentine, the specimen is plunged suddenly into hot water, when the conversion of the turpentine into vapor between the two layers of the wings so far separates these layers that they can be easily parted and mounted in the usual way as microscopical preparations on a slide.

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SCIENTIFIC NEWS.

—No glaciers exist in the United States but those of the Pacific coast, as only here the atmospheric conditions are favorable, and the ice-streams of Mt. Hood are the only ones on this coast easily reached. Down far below the snow line, great seas of ice push their way through valleys they have cut for themselves. Their downward motion varying in speed with the slope of the channel and the weight of snow above, is constant—a few inches a day. The lower part is ice, higher, icy-snow; and where there is little thaw, pure snow. The fields of the ice are strewn with unassorted debris, from bowlders weighing tons, to the finest sand which falls from the walls of the glacier valley. Near the foot of the glacier the rubbish is twelve inches or more thick, while in other places one can walk over nearly bare ice—aye, can travel for miles and study moraines, crěvasses, ice wells, caves, ice tables and all the appurtenances of a first-class glacier without guide or alpenstock, ropes, or spiked shoes. The ice moves as only ice can, moulding itself to variations in the channel, and splitting across to form crevasses only when meeting some great descent in the bed. Melting extends up over the surface as well as at the base; the traveler steps across streamlets flowing upon the ice surface toward the base, perhaps to lose themselves in crevasses further down; and from the wedge-shaped snout of the ice giant pours a deluge of water, while down its face rains a shower of sand and rocks. The water assorts the debris, soon dropping the bowlders, carrying the coarse sand further, and bearing to the Columbia much of the ashy sand that is filed off by the bottom of the glacier.—*Portland Oregonian.*

— Professor W. A. Rogers, of the Harvard Observatory, has reported to the American Academy of Arts and Sciences, in Bos-

[1] G. Dimmock, Pysche, May, 1884, p. 170.